

Confidentiality Level	<i>BL - Restricted for internal use</i>	TC ID / Revision	00153898/C
Document Status	<i>Document Released</i>	Document No.	N/A
WBS code	<i>5.2 - RP3 Particle acceleration by lasers</i>		
PBS code	<i>E.E4.ELMA.4.5.4</i>		
Project branch	<i>Engineering & Scientific documents (E&S)</i>		
Document Type	<i>Specification (SP)</i>		

[RSD product category A]

Dpt. 92
Real-time Digital Oscilloscope
TP17_090



Keywords

N/A

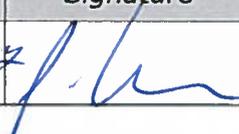
	Position	Name
Responsible person	Senior researcher	Valentina Scuderi
Prepared by	Senior researcher	Valentina Scuderi

<i>RSS TC ID/revision</i>	<i>RSS - Date of Creation</i>	<i>RSS - Date of Last Modification</i>	<i>Systems Engineer</i>
012736/A.001	26.07.2017 16:12	26.07.2017 16:12	Aleksei Kuzmenko
012736/A.002	16.08.2017 17:42	16.08.2017 17:42	Aleksei Kuzmenko
012736/A.003	22.08.2017 19:06	22.08.2017 19:07	Aleksei Kuzmenko

Reviewed By

<i>Name (Reviewer)</i>	<i>Position</i>	<i>Date</i>	<i>Signature</i>
Daniele Margarone	Team Leader RP3	NOTICE (RSD product category A)	
Ladislav Půst	Manager installation of technology	NOTICE (RSD product category A)	
Pavel Bastl	CS Group Leader	NOTICE (RSD product category A)	
Roman Kuřátko	Facility Manager	NOTICE (RSD product category A)	
Tomáš Laštovička	Team Leader BIS	NOTICE (RSD product category A)	
Veronika Olšovcová	Safety Coordinator	NOTICE (RSD product category A)	
Viktor Fedosov	SE & Planning group leader; Quality Manager	NOTICE (RSD product category A)	

Approved by

<i>Name (Approver)</i>	<i>Position</i>	<i>Date</i>	<i>Signature</i>
Georg Korn	Science and Technology Manager, Scientific coordinator of RP2-6	23. 08. 2017	

Revision History / Change Log

<i>Change No.</i>	<i>Made by</i>	<i>Date</i>	<i>Change description, Pages, Chapters</i>	<i>TC rev.</i>
1	D. Margarone, V.Scuderi	26.07.2017	RSD draft creation	A
2	A.Kuzmenko, V.Scuderi, F.Schillaci	16.08.2017	RSD update, version for internal review	B
3	A.Kuzmenko	22.08.2017	RSD formal update, final version for approval	C

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1. Introduction

1.1. Purpose

This Requirements Specification Document (RSD) lists the technical requirements and constraints on product being purchased for the department 92 of ELI Beamlines project.

1.2. Scope

The RSD contains all of the technical requirements: functional, performance and design, delivery, safety and quality requirements for the following product: **Real-time Digital Oscilloscope** (further "**Oscilloscope**").

This product is a product **Category A** according to the ELI Beamlines RSD categories of products. The Category A is an Off-the-shelf Product without necessity of modifications and necessity to be subjected to a verification program (review of design, inspection and testing) for ELI applications by the actual project specifications. All verification activities performing by a supplier shall be executed in accordance with the supplier's plan of outgoing inspection and tests. Internal Acceptance Procedure of the product Category A shall be established and applied before the product implementation (operation phase).

1.3. Terms, Definitions and Abbreviations

For the purpose of this document, the following abbreviated terms are applied:

Abbreviation	Meaning
AC	Alternating Current
BW	BandWidth
CA	Contracting Authority
Ch	Channel
CPU	Central Processing Unit
DC	Direct Current
ELI	Extreme Light Infrastructure
GND	Ground
pts	points
RMS	Root Mean Square
RSD	Requirements Specification Document
USB	Universal Serial Bus
WXGA	Wide eXtended Graphics Array

1.4. References to standards

If this document includes references to standards or technical documents the CA allows/permits also another equal solution to be offered. If the Supplier offers another equal solution the CA shall not reject its bid, once the Supplier by appropriate means in the bid proves that the offered supplies, services or works meet in an equivalent manner the requirements including references to standards or technical documents.

2. Functional, Performance and Design requirements

2.1. General technical requirements

REQ-021479/A

The Oscilloscope shall provide real time signal registration of at least 4 analog channels with a bandwidth of at least 2.5 GHz, sampling rate per channel greater than 20 GS/s and a standard memory on 4 channels with at least saved points of 64 Mpts/Channel.

REQ-021480/A

The Oscilloscope shall provide a minimum of 8 bits vertical resolution.

REQ-021481/A

The Oscilloscope shall be provided with a WXGA Color Display, at least 12.1" Touch Screen and a Multi-tab Display Option with at least 4 channels simultaneous display of real time signal.

REQ-021482/A

The performance parameters of the Oscilloscope shall correspond to the requirements given in table 1 below.

Item N°	Parameters	Minimum Requirements
1	Analog Bandwidth	@ 50 Ω (-3 dB): 4 GHz (\geq 5 mV/div) @ 1 M Ω (-3 dB): 500 MHz (typical)
2	Rise Time	@ 50 Ω , 10-90 % of rising waveform: 100 ps (typical) @ 50 Ω , 20-80 % of a rising waveform: 75 ps (typical)
3	Vertical Resolution	8 bits
4	Sensitivity	@ 50 Ω : 1 mV – 1 V/div (fully variable) @ 1 M Ω : 1 mV – 10 V/div (fully variable)
5	DC Vertical Gain Accuracy	\pm 1% of full scale, offset at 0 V (Gain Component of DC Accuracy)
6	DC Vertical Offset Accuracy	\pm (1.5 % of offset setting +1% of full scale + 1 mV) or better
7	Maximum Input Voltage	@ 50 Ω : 5 V RMS \pm 10 V peak @ 1 M Ω : 400 V max. (DC + peak AC < 10 kHz)
8	Sample Rate (Single-shot)	20 GS/s on 4 Ch 40 GS/s on 2 Ch

Item N°	Parameters	Minimum Requirements
9	Sample Rate (Repetitive)	200 GS/s for repetitive signals (20 ps/div to 10 ns/div)
10	Memory Length	4 Ch mode: 64 Mpts 2 Ch mode: 128 Mpts 1 Ch mode: 128 Mpts
11	Intersegment Time	1 μ s
12	Input Coupling	1 M Ω : AC, DC, GND 50 Ω : DC, GND
13	Processor (CPU Type)	Intel® i5-3610 Dual Core, 2.7 GHz (equal or better solution is possible)
14	Processor Memory	16 GB (standard)

Table 1: Performance parameters of the Oscilloscope.

2.2. Interface requirements

REQ-021483/A

The Oscilloscope shall be equipped with 10/100 Base-T Ethernet connection and USB connection.

REQ-021484/A

The software of the Oscilloscope shall run on 64 Bits Windows 7 operation system (or newer version).

REQ-021485/A

Local language user interface (language preferences of the Oscilloscope/Software) shall be in English.

2.3. Power supply

REQ-021486/A

The Oscilloscope shall have power supply compatible with input voltage in minimal ranges of 100-240 V AC \pm 10% at 50/60 Hz \pm 5%; 110-120 V AC \pm 10% at 400 Hz \pm 5% (Automatic AC Voltage Selection).

REQ-021487/A

The Oscilloscope shall have the following maximum power consumption:

- Nominal Power Consumption: 415 W / 415 VA;
- Max. Power Consumption: 500 W / 500 VA (with all PC peripherals and active probes connected to 4 channels).

3. Delivery requirements

REQ-021612/A

The delivery to the final destination at the ELI Beamlines, of the Oscilloscope shall be conducted by the Supplier.

4. Safety Requirements

REQ-021613/A

The Supplier shall supply a Declaration of Conformity or any other equivalent document legally recognized and accepted in the Czech Republic for each product type if the appropriate legislation determines the Supplier's obligation to have a Declaration of Conformity (or the equivalent document) for the purposes of a Device sale in the Czech Republic to fulfil the requirements of 2001/95/EC directive or applicable Czech law.

5. Quality Requirements

5.1. General Quality Requirements

REQ-021488/A

The Supplier shall provide the Product User Manual as part of the delivered Device. The Manual shall include the instructions and descriptions regarding the following procedures:

- transport, handling, storage and cleaning;
- installation and calibration (see REQ-021489/A);
- safe operation and maintenance procedures.

NOTE: The scope of the User Manual shall be agreed with the CA before Product delivery.

REQ-021489/A

The Supplier shall provide information on execution of outgoing check of the Product. At least this information shall comprise declaration about execution of outgoing check and declaration of conformity with technical requirements defined by the product RSD and completeness of the Product.

NOTE: Alternatively the Supplier might provide the CA with information (e.g.: catalogue/technical data sheets, product manuals or other similar documentation) subject to the condition that such documentation is detailed enough to prove meeting all requirements stipulated herein.

REQ-021490/A

The Supplier shall supply Calibration Certificate which shall establish:

- the relation between quantity values with measurement uncertainties provided by measurement standards and the corresponding indications with associated measurement uncertainties;
- the relation for obtaining a measurement result from an indication (if required).

NOTE: The Supplier shall define calibration interval for the Oscilloscope.

REQ-021491/A

The Supplier shall establish and maintain a non-conformance control system compatible with ČSN EN ISO 9001 (equivalent to EN ISO 9001).

5.2. Specific Quality requirements

REQ-021492/A

In case of the Oscilloscope repair by the Supplier within the validity of warranty, the Supplier shall recalibrate and verify the Oscilloscope once the repair is completed. The results of this process shall be provided to the CA.